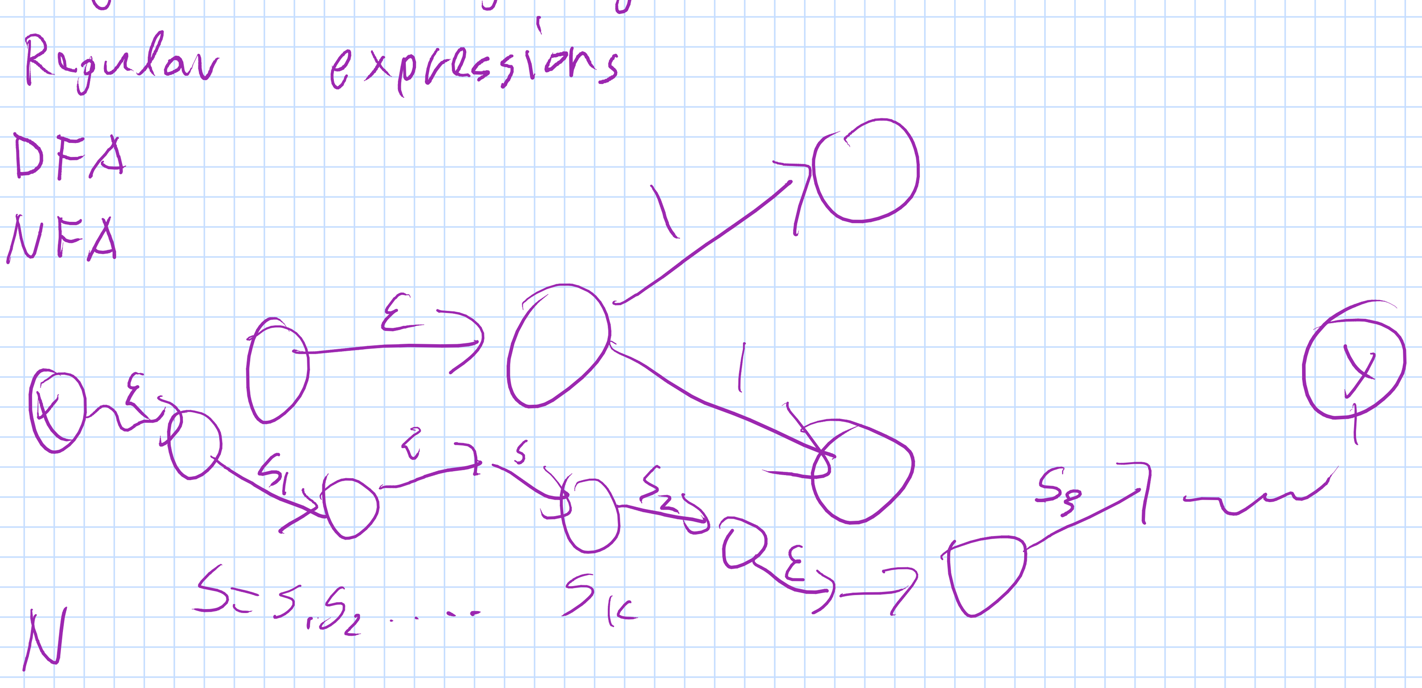
Lecture 5 9/6/22

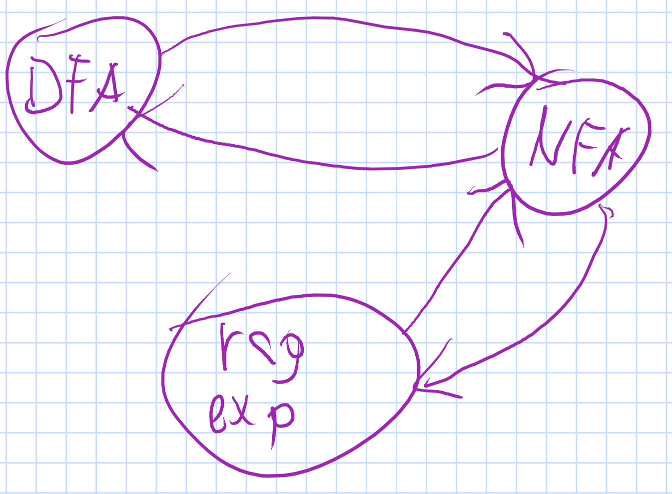
- Σ alphabet
  Regular languages
- Regular expressions
- DFA
- NFA



$s = s_1 s_2 \ldots s_k$

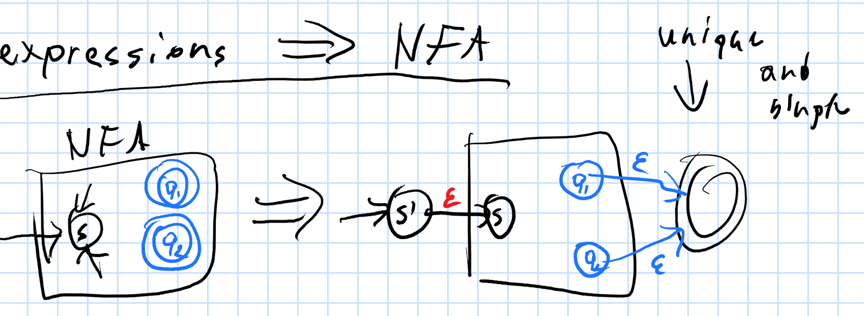
N

$x \xrightarrow{s} y$

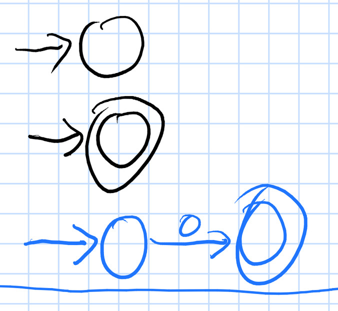


$\{0^i 1^i \mid i \geq 0\}$

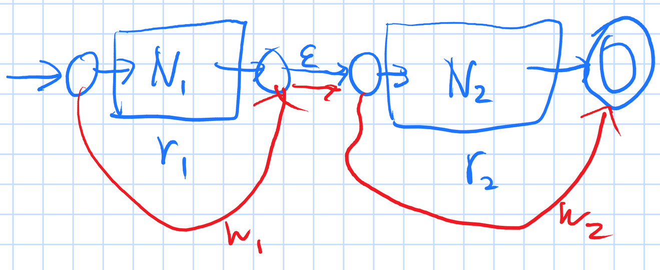
Reg expressions $\Rightarrow$ NFA



- $\phi = \{\}$
- $\{\varepsilon\}$
- $\forall a \in \Sigma$ $\{a\}$



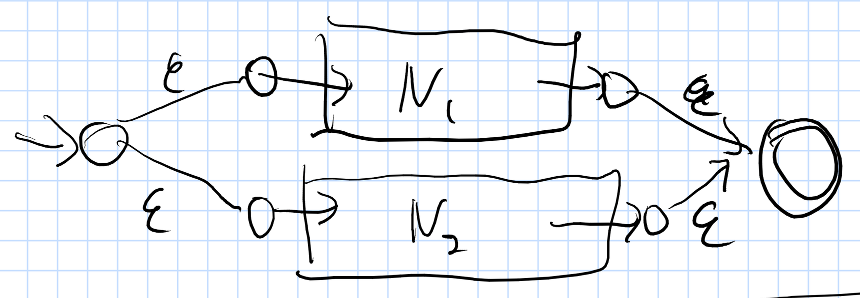
- $r_1 r_2$



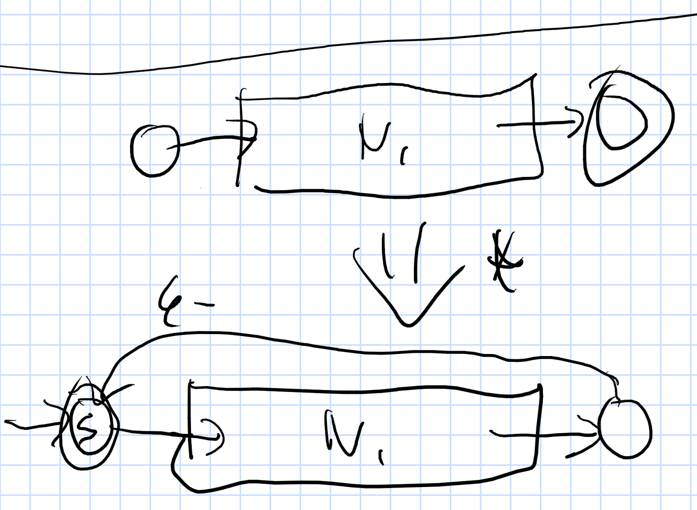
$w \in L(r_1 r_2)$

$w = w_1 w_2$ $w_1 \in L(r_1)$ $w_2 \in L(r_2)$

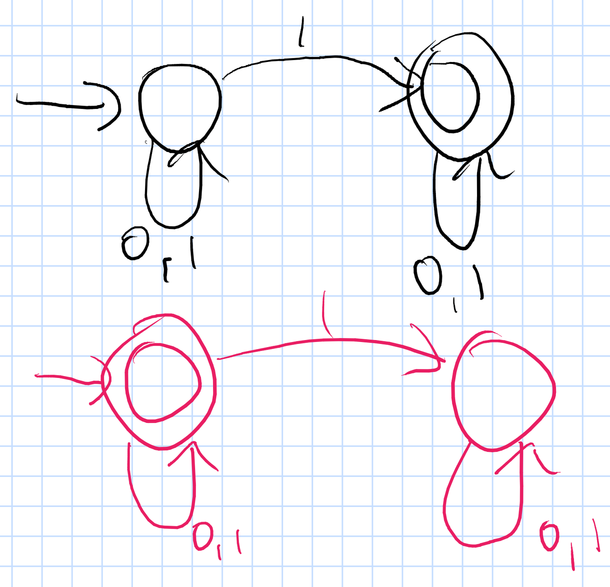
$r_1 + r_2$



$(r_1)^*$



$L(r_1) = L(N_1)$



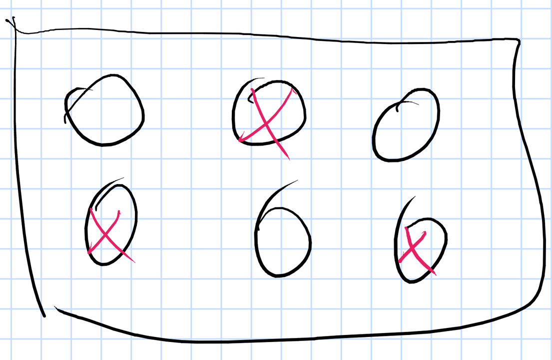
$L(N)$

$L(\tilde{N}) = \{0,1\}^*$

Complementing the accepting states does not result in an NFA that accepts the complement language

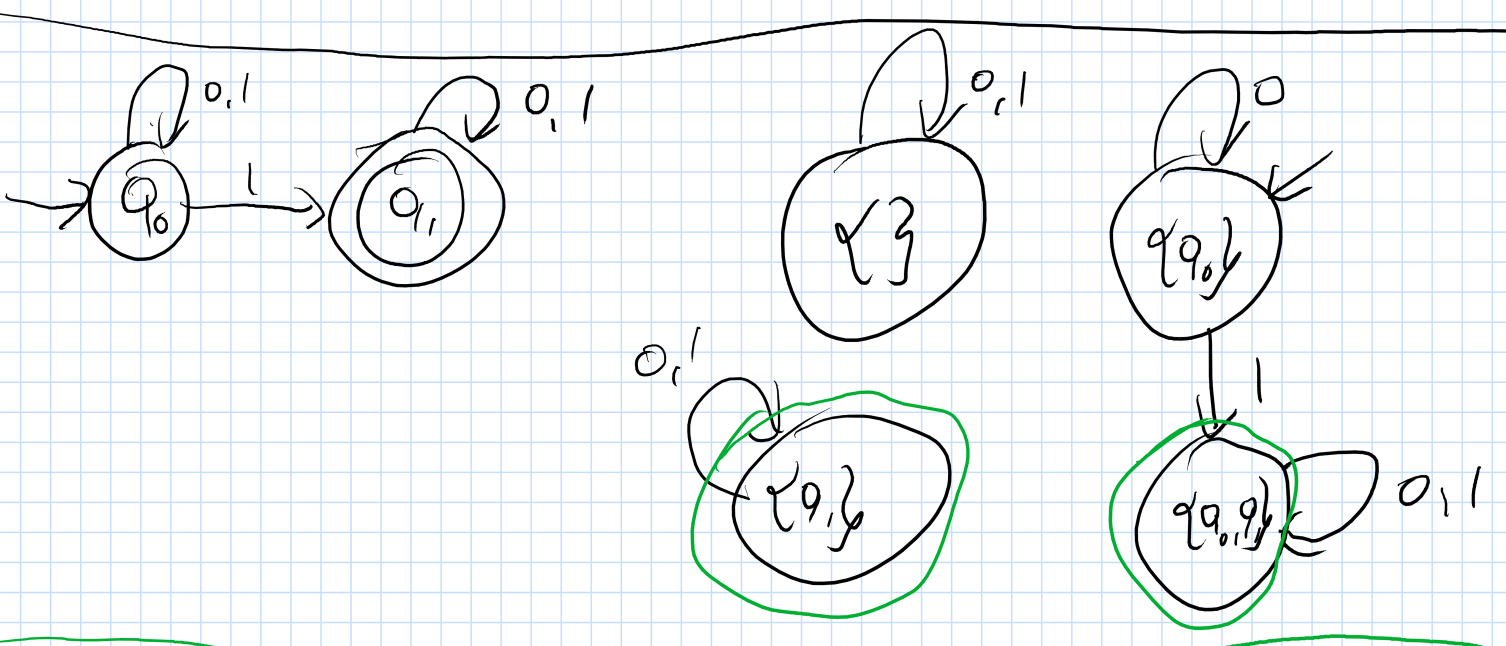
NFA $\Rightarrow$ DFA

what is the configuration of the NFA?



configuration
"
the set of states the NFA might be in certain time.

$\exists$ NFA N has t states then it defines
t .



$N = (Q, \Sigma, s, \delta, A)$ NFA

$D = (P(Q), \Sigma, \varepsilon\text{-reach}(s), \hat{\delta}, \{C \in P(Q) \mid C \cap A \neq \emptyset\})$

$\quad \shortparallel$

$2^Q = \{X \mid X \subseteq Q\}$

$\hat{\delta} : P(Q) \times \Sigma \to P(Q)$

$\hat{\delta}(C, a) = \bigcup_{q \in C} \delta^*(q, a)$, $C \subseteq Q$

Lemma

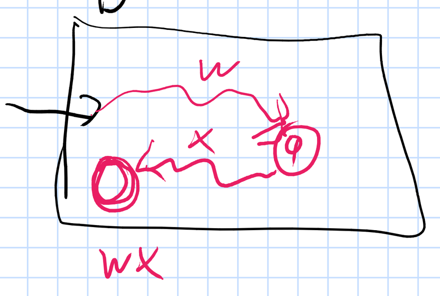
Let L be a regular lang

$\Rightarrow$ $\text{PREFIX}(L) = \{w \in \Sigma^* \mid \exists x \in \Sigma^* \text{ s.t. } wx \in L\}$

Proof

D: DFA that accepts L

D



D'